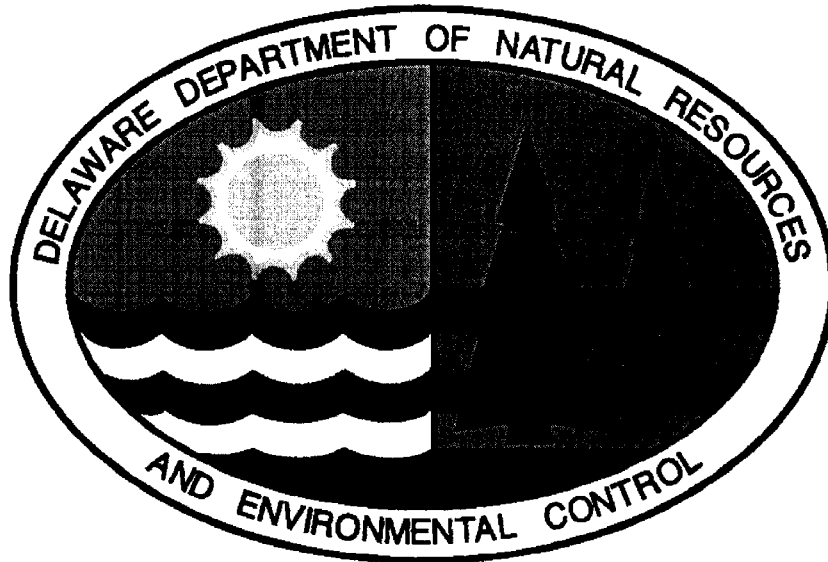


## FINAL PLAN OF REMEDIAL ACTION

Deemer Steel Site - Operable Units-II & III  
New Castle, DE

DNREC Project No. DE 1244/1245



March 2002

Delaware Department of Natural Resources and Environmental Control  
Division of Air and Waste Management  
Site Investigation & Restoration Branch  
391 Lukens Drive  
New Castle, Delaware 19720

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## 1.0 INTRODUCTION

The Deemer Steel Site (Site) is located at Ninth and Washington Street, in New Castle, Delaware (Figure 1). In June 1997, Buck Kennett Associates, LLC (Buck Kennett) entered into a Voluntary Cleanup Program (VCP) Agreement with the Department of Natural Resources and Environmental Control, Site Investigation and Restoration Branch (DNREC). Under the provisions of the Delaware Hazardous Substance Cleanup Act (HSCA), 7 Del. C. Chapter 91, Buck Kennett completed a Facility Evaluation (FE) to evaluate the potential presence of contaminants in the soil associated with historic Site uses. In July 1999, Buck Kennett entered into a second VCP Agreement. Through this second VCP Agreement, Buck Kennett agreed to investigate the potential risks posed to the public health, welfare, and the environment through the performance of a Remedial Investigation and Feasibility Study (RI/FS). The purpose of the RI/FS was to obtain sufficient detailed Site information to supplement the earlier FE and develop an appropriate remedial approach. Buck Kennett contracted WIK Associates, Inc. (WIK) to perform the FE and RI/FS of the Site.

The purpose of the RI/FS was to: 1) characterize the nature and extent of any soil and/or groundwater contamination at the Site, 2) evaluate risks to public health, welfare, and the environment associated with identified contamination, and 3) perform a FS that would identify and recommend a Remedial Action.

For the remedial alternative evaluation, the Site was divided into three operable units in July 1999 during the RI/FS. The Proposed Plan for the OU-II Site was issued in July 2001. Due to the change in development plans affecting the land use for the site (commercial to residential use) the Final Plan of Remedial Action for OU-II was never issued. The remedy for unrestricted (residential) use requires the removal and containment of soils not initially required under the original Proposed Plan for OU-II. In February 2002, a Revised Proposed Plan of Remedial Action was issued for the Site which included OUII and OU-III.

As described in Section 12 of the Regulations, DNREC provided notice to the public and an opportunity for the public to comment on the Proposed Plan. At the comment period's conclusion, DNREC did not receive any written or verbal comments to the Revised Proposed Plan and is subsequently issuing this Final Plan of Remedial Action (Final Plan). The Final Plan designates the selected remedy for the Site. The Proposed Plan, all prior investigations of the Site, and the Final Plan will constitute the Remedial Decision Record for the Site.

This document is the Department's Final Plan of Remedial Action (Final Plan) for the Site. It is based on the results of the previous investigations performed at the Site. This Final Plan is issued under the provisions of the HSCA and the Regulations Governing Hazardous Substance Cleanup (Regulations). It presents the Department's assessment of the potential health and environmental risk posed by the Site.

Section 2.0 presents a summary of the Site description, Site history and previous investigations of the Site. Section 3.0 provides a description of the Remedial Investigation results. Section 4.0 presents a discussion of the Remedial Action Objectives. Section 5.0 presents the Final Plan of Remedial Action, Section 6.0 discusses public participation requirements, and Section 7.0 presents the Director's Declaration.

## **2.0 SITE DESCRIPTION AND HISTORY**

### **2.1 Site Setting**

The Site consists of three parcels of land designated by New Castle County as Tax Parcel Nos. 21-014.00-499, 21-014.00-183 and 21-014.00-541, containing a total of app (7.67) acres located at Ninth and Washington Street in New Castle, Delaware. Washington Street borders the Site to the west, Ninth Street borders the Site to the south and Gray Street borders a portion of the property to the east. Two small streams join on the northern end of the Site and the resultant single stream crosses the Site from northwest to the southeast. The Site is currently a vacant lot. Surrounding land uses include primarily residential properties to the north, east and west. A City of New Castle water tower is present to the northeast of the Site, and the New Castle Steel Plant (NCSP), a former National Priority List (NPL) site is located southeast of the Site, across Ninth Street.

For the remedial alternative evaluation, the Site was divided into three Operable Units (OUs) in July 1999 during the RI/FS (Figure 2). The Site is comprised of an easternmost parcel (0.9297 acres), Tax Parcel No. 21-014.00-499 designated as Operable Unit-I (OU-I), an adjacent parcel (5.9863 acres), Tax Parcel No. 21-014.00-183 designated as Operable Unit-II (OU-II) and a southeastern parcel (0.7493 acres), Tax Parcel No. 21-014.00-541 designated as Operable Unit-III (OU-III). This Final Plan is limited to OU-II and OU-III. The Final Plan for OU-I will be issued as a separate document.

### **2.2 Site and Project History**

Title transfer records and historic aerial photographs were reviewed to evaluate the history and previous uses of the Site. Records indicate the Site has been owned and/or operated as a steel foundry by the Deemer Steel Casting Company (Deemer Steel) from the early 1900s until 1987. In the early 1990s, the buildings comprising the Deemer Steel operation were demolished. Currently, the Site is overgrown with vegetation and large slab foundations remain on Site.

## **3.0 INVESTIGATION RESULTS**

### **3.1 Results of Previous Investigations**

#### **3.1.1 Subsurface Investigation**

During a Site visit prior to the commencement of the initial investigation of the site, numerous hazardous substances in various containers were noted on Site. These containers were later removed from the site after Deemer Steel ceased operations.

Drum consolidation and disposal activities were conducted by Resource Recovery Atlantic, Inc. (RRAI) technicians. The polychlorinated biphenyls (PCB) capacitors and the waste PCB drums were also classified and packaged during Site activities. On February 14, 1995, waste paint, caustic solutions and non-hazardous solids were shipped to Remtech Environmental Group in Lewisberry, PA. Eight drums of waste paint related materials were rejected by the disposal facility because they were suspected to contain PCBs. The drums were resampled and classified. The PCB-contaminated drums were shipped to Laidlaw Environmental in Laurel, MD. and the

non-PCB drums were shipped to Chem Met Services in Wyandotte, MI. On August 4, 1995, the PCB capacitors were shipped in two drums to S.D. Myers, Inc. in Tallmadge, OH.

In April 1995, the two 500 gallon underground storage tanks (USTs) and one 6,000 gallon UST were emptied and cleaned. On July 1, 1996, RRAI sampled six transformers. Samples of the oil were collected from the top and bottom of the transformers. The report indicated that the PCB results were below 50 ppm and the transformers were shipped to G & S Technologies Division in Kearny, New Jersey, for disposal. Once the transformers were removed, the concrete pad was cleaned and sampled. Contaminated soil was removed from those areas that had total petroleum hydrocarbon (TPH) concentrations above the DNREC-USTB Moderate Risk Action Level and also from areas where the soil was discolored. This soil was placed in a roll-off and taken to Eldredge Inc. in Chestertown, MD for recycling.

RRAI performed additional Site characterization in 1996 using a Geoprobe® (RRAI, 1996). Fourteen soil samples were obtained; eight of these samples were analyzed for TPH. Analytical results ranged from below the method detection limit to 166 (mg/kg). The analytical results were below the DNREC-USTB Moderate Risk Action Level of 1,000 mg/kg. On November 4, 1996, RRAI issued a report summarizing the waste consolidation, tank cleaning, transformer removal and soil removal activities performed at the Site (RRAI, 1996).

### **3.1.2 Hydrogeologic Investigation for Fuel Oil Tank Removal**

RRAI conducted a Field Investigation Program for the Site in February 1996 (RRAI, 1996). The investigation was conducted to characterize the subsurface conditions in the areas surrounding the single 6,000-gallon diesel UST. The UST was located near the main gate to the Deemer Steel Site on Ninth Street. Figure 3 shows the location of the former UST.

RRAI installed monitoring wells, excavated test pits, and advanced Geoprobe® borings in order to delineate the horizontal and vertical extent of hydrocarbon soil contamination. Analysis of samples indicated that low levels of total petroleum hydrocarbon (TPH) concentrations were present in the initial groundwater samples. The report also concluded that some of the soil samples contained TPH concentrations above the DNREC-USTB Moderate Risk Action Level of 1,000 parts per million (ppm). The elevated concentrations were detected in three samples ranging in depth from 1.5 feet to 4 feet below ground surface (bgs). The report concluded that the UST and the associated piping were the most likely cause of the petroleum contamination.

### **3.1.3 Phase II Subsurface Investigation**

In June 1996, RRAI performed additional Geoprobe® investigation activities to characterize the Site and performed soil excavation (RRAI, 1996). Soil was excavated in the three areas determined to be above the DNREC-USTB Moderate Risk Action Level during the first stage of the Field Investigation Program. Additional soil was excavated in areas with soil discoloration. Twenty soil samples were collected and analyzed for TPH. Two of the samples analyzed for TPH exceeded the DNREC-USTB Moderate Risk Action Level of 1,000 ppm. These samples, plus four additional samples, were collected at or above the water table. The remaining 14 samples were collected below the water table.

One post-excavation sample (B-18 PX) was analyzed for Priority Pollutants plus 40 tentatively identified compounds. This sample was collected from the drum storage area where discolored soil was excavated. One post-excavation sample (PX) was analyzed for PCBs. It appears that this sample was collected from the former transformer area. The analytical results indicated that concentrations of benzo(a)pyrene, benzo (b)fluoranthene, and arsenic in sample B18 PX exceeded the EPA Region III Risk Based Concentrations (RBCs). The analytical results indicated that both samples B-18 PX and PX exceeded the DNREC Residential Surface Soil Reporting Level for PCBs.

#### **3.1.4 Facility Evaluation, 1997**

In July 1997, WIK conducted a Facility Evaluation (FE) to evaluate the nature and extent of soil contamination on the Deemer Steel Site (WIK, 1999). At the time of the FE, the Site was divided into Parcel A (west of the stream) and Parcel B (east of the stream). These parcel boundaries do not correspond to the actual tax parcel boundaries (OUs). The FE investigation included the excavation of 21 test pits across the site (Figure 3). A total of 35 surface and subsurface soil samples were collected from the test pits. The soil samples were field screened using DNREC's mobile laboratory for carcinogenic polynuclear aromatic hydrocarbons (PAHs), pesticides, PCBs, and Target Analyte List (TAL) metals. Based on the field screening results, selected samples (25%) were analyzed using HSCA protocols at Envirotech Research, Inc. The samples were analyzed quantitatively for semi-volatile organic compounds (SVOCs), Target Compound List (TCL) pesticides, PCBs, cyanide, and TAL metals or Resource Conservation and Recovery Act (RCRA) metals.

Based on the data collected, the primary contaminants of concern on Parcel A were PAHs in both the surface (0 to 1 foot depth) and subsurface soil, and arsenic in the subsurface soil. The primary contaminants of concern in Parcel B were PAHs and manganese in the surface soil and there were no contaminants of concern in the subsurface soil. Visible petroleum product floating on the surface of the groundwater was observed in test pit TP15 and a petroleum sheen was observed on the groundwater in test pits TP18, TP19, and TP21, located in the southeastern corner of Parcel A.

Due to the presence of petroleum free product on the groundwater table in the southeastern section of Parcel A, WIK recommended that additional characterization be undertaken to fully assess the extent of contamination.

#### **3.1.5 Remedial Investigation, 1999**

In 1999, a Remedial Investigation/Feasibility Study (RI/FS) was completed on the entire Site. The RI/FS was completed to address the remaining data needed for the Site including delineation of the petroleum hydrocarbon impacted area and the collection of groundwater samples. On December 6, 1999, WIK excavated five trenches, consisting of 22 test pits, and 10 additional test pits in the southeastern corner of Parcel A on the Site and installed 4 monitoring wells on Site (Figures 4 & 5). The test pit locations were concentrated in the previously identified area of

contamination along Ninth Street. The test pits were excavated to the water table, a depth of approximately three feet bgs. A total of twelve soil samples were screened for the following compounds:

- Extractable Petroleum Hydrocarbons (EPH)
- Volatile Petroleum Hydrocarbons (VPH)
- Polynuclear Aromatic Hydrocarbons (PAHs)
- Polychlorinated Biphenyls (PCBs)

Based on the screening results, samples were selected for VPH and EPH analysis. The EPH range of analytical parameters includes C<sub>9</sub>-C<sub>18</sub> aliphatic hydrocarbons, C<sub>19</sub>-C<sub>36</sub> aliphatic hydrocarbons, C<sub>11</sub>-C<sub>22</sub> aromatic hydrocarbons, and PAHs. The VPH range of analytical parameters includes C<sub>5</sub>-C<sub>8</sub> aliphatic hydrocarbons, C<sub>9</sub>-C<sub>12</sub> aliphatic hydrocarbons, C<sub>9</sub>-C<sub>10</sub> aromatic hydrocarbons, benzene, toluene, ethylbenzene, xylenes, naphthalene, and methyl tert-Butyl ether (MTBE).

The screening results indicated that detectable concentrations of EPH compounds above URS restricted and unrestricted use criterion were found in five of the twelve soil samples (TP01-S001, TP01-S002, TP02-S001, TP11-S001, and TP12-S001) (Appendix A). The screening results indicated that VPH compounds were not detected in any of the soil samples. All of the soil samples collected were screened for PCBs using Omichron Immunoassay techniques, and PCBs were not detected in any of the samples. The analytical results are presented in Appendix A.

The extent of the petroleum hydrocarbon contaminated soil was delineated and a combination approach of a passive oil recovery system and assisted bio-remediation was recommended for remediation of the free product.

A total of four groundwater samples were collected from the monitoring wells. The groundwater samples were analyzed for full TAL/TCL parameters according to HSCA protocols. The analytical results for each sample were compared with the DNREC's URS criteria in a non-critical water resource area.

Organic compounds were not detected in the groundwater above the DNREC URS. Concentrations of the inorganics, aluminum, chromium, iron, lead, manganese and vanadium, exceeded the respective URS concentrations in the groundwater in at least one of the monitoring wells (Appendix A).

A site specific risk assessment was performed to evaluate the cumulative risks associated with the exposure to soil and ingestion of groundwater on the Site. The calculations were conducted using the DNREC Site-Specific Calculator for Multiple Analytes (DNREC May 2000 version) assuming a current and future unrestricted use scenario. Even though there was sufficient soil SVOC data, the arithmetic mean was used instead of 95% UCL to derive the calculated risks, since the value was more conservative.

The assessment indicates that the unrestricted use cumulative risks, carcinogenic and non-carcinogenic, are  $1.14 \times 10^{-4}$  and a Hazard Index (HI) of 1.04, respectively. Two compounds, arsenic and benzo(a)pyrene, have individual risks that exceed the DNREC guidelines of  $1 \times 10^{-5}$

for carcinogenic compounds and a HI of 1 for non-carcinogenic risks. These risks are above the DNREC guidelines for unrestricted use; therefore, further action is required prior to development for residential purposes.

The site-specific risk assessment also included evaluation of the human health risk from the ingestion of on-site drinking water. The assessment indicates that the cumulative carcinogenic risk associated with groundwater is  $6.83 \times 10^{-5}$ , which exceeds DNREC's risk guideline of  $1 \times 10^{-5}$  (DNREC, 1996). This cumulative risk is driven by the individual risk associated with arsenic. However, the maximum concentration detected in the groundwater was  $6.7 \mu\text{g/L}$  and the mean is  $3.03 \mu\text{g/L}$ , below the State arsenic drinking water Maximum Contaminant Level (MCL) standard of  $10 \mu\text{g/L}$ .

The assessment indicates that the cumulative non-cancer HI is 1.75 in groundwater, which is above the DNREC guideline of 1. However, 60 percent of the risk associated with drinking the groundwater is attributable to iron, a naturally occurring compound in groundwater in the New Castle area (Woodruff, 1970; Johnston, 1973).

#### **4.0 REMEDIAL ACTION OBJECTIVES**

According to Section 8.4 (1) of the Regulations, site-specific Remedial Action Objectives (RAOs) must be established for all Plans of Remedial Action. The remedial action will be evaluated for soil only based on the following factors:

- The Site is currently zoned as multi-family residential land and is currently vacant;
- The future Site use is expected to be residential;
- Surrounding land uses are mixed, including commercial and residential.
- Soil at the Site has been impacted by various chemical constituents. Based on the nature and extent of the contaminants, arsenic, petroleum hydrocarbons, and PAHs are the primary contaminants of concern.
- The primary exposure pathways are inhalation, direct contact with, and incidental ingestion of, impacted soil.

Qualitative objectives describe, in general terms, what the ultimate result of the Remedial Action at the Site should be. Considering that OU-II and OU-III will be developed for residential use, the following qualitative objectives were developed:

- Control potential human contact (dermal and ingestion) with contaminated soil.
- Minimize soil contaminant migration (free product migration) to the surface water (on-site stream).

Quantitative objectives define specific levels of Remedial Action to achieve protection of human health and the environment. Based on the qualitative objectives, the following quantitative objectives were developed for OU-II and OU-III:

- Prevent contact with soil having a benzo(a)pyrene concentration equal to or greater than  $0.09 \text{ mg/kg}$ .

- Prevent contact with soil having an arsenic concentration equal to or greater than 11 mg/kg.
- Prevent contact with petroleum hydrocarbon contaminated soil.
- Prevent contact with and off-site migration of free-phase petroleum hydrocarbons.

## 5.0 FINAL PLAN OF REMEDIAL ACTION

Based upon the information and results of the investigation performed at the Site and the Remedial Action Objectives, DNREC has determined that the remedy conveyed in the Proposed Plan of Remedial Action for the Deemer Steel Site, OU-II and OU-III should be adopted as the Final Plan. The Final Plan consists of the following:

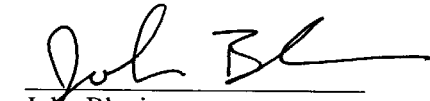
1. In-situ capping of contaminated soil that exceeds a  $1 \times 10^{-5}$  but is less than the  $1 \times 10^{-4}$  cumulative risk for carcinogenic compounds or a HI of 1 for non-carcinogenic compounds in soil, under the footprint of a building as approved by DNREC.
2. Excavation and removal of soils that exceed a  $1 \times 10^{-4}$  cumulative risk level.
3. The placement of an institutional control (i.e., deed restriction) which (a) prohibits the installation of wells or the use of groundwater on the Site without the prior written approval of DNREC; (b) requires written approval from DNREC prior to any soil disturbing activities; and (d) requires written approval from DNREC prior to the repair, renovation or demolition of any building used to cap contaminated soils, or any other activity that may disturb contamination under the foot-print of the building or surrounding pavement.
4. Remediation of the free-phase petroleum product in soil and groundwater using a combination of an oil recovery system and bio-remediation technology.
5. A groundwater management zone (GMZ) will be established, which will restrict groundwater withdrawals at this Site and protect the public health, welfare and the environment. The GMZ will be administered via a memorandum of understanding between DNREC Division of Air and Waste Management and Division of Water Resources.
6. Prepare and implement an Operation and Maintenance Plan to maintain the integrity of the soil barrier(s) and ensure the effectiveness of the passive free product recovery system. The Operation and Maintenance Plan should also include a groundwater monitoring plan to ensure that natural attenuation of the hydrocarbons detected in the groundwater is occurring.
7. Preserve and protect the stream located on site by maintaining its integrity during site regrading. It may be incorporated into the Stormwater and Erosion Control Plan for the Site with prior DNREC approval.

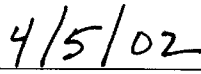
## 6.0 PUBLIC PARTICIPATION

The Department actively solicited public comments or suggestions on the Proposed Plan of Remedial Action and welcomed opportunities to answer questions. The comment period began on February 25, 2002, and concluded at the close of business (4:30 p.m.) on March 18, 2002. No written comments or requests for a public hearing were received by DNREC.

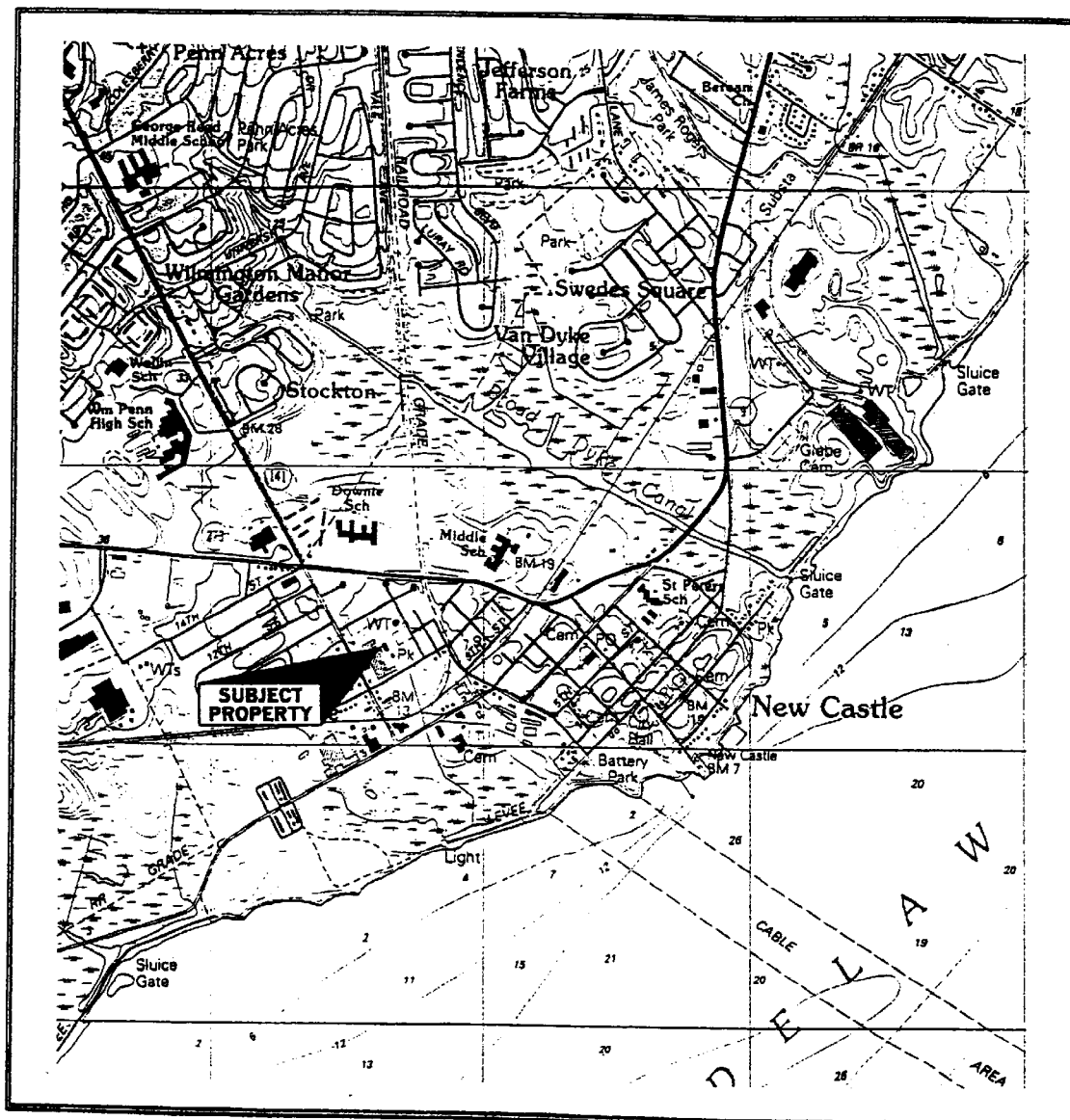
## 7.0 DECLARATION

This Final Plan of Remedial Action for the Deemer Steel Operable Unit II and Operable Unit III Site is protective of human health, welfare and the environment and is consistent with the requirements of the Delaware Hazardous Substance Cleanup Act.

  
\_\_\_\_\_  
John Blevins  
Director, Division of Air and Waste Management

  
\_\_\_\_\_  
Date

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DE 1244/1245 II B8



## Figure 1

### Site Location/Topographic Map

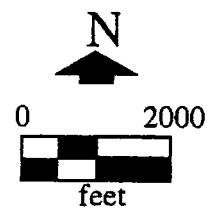
Wilmington South Quadrangle: 7.5 minute series

Map Date: 1989 Map edited 1993

Deemer Steel Casting Company

New Castle, Delaware

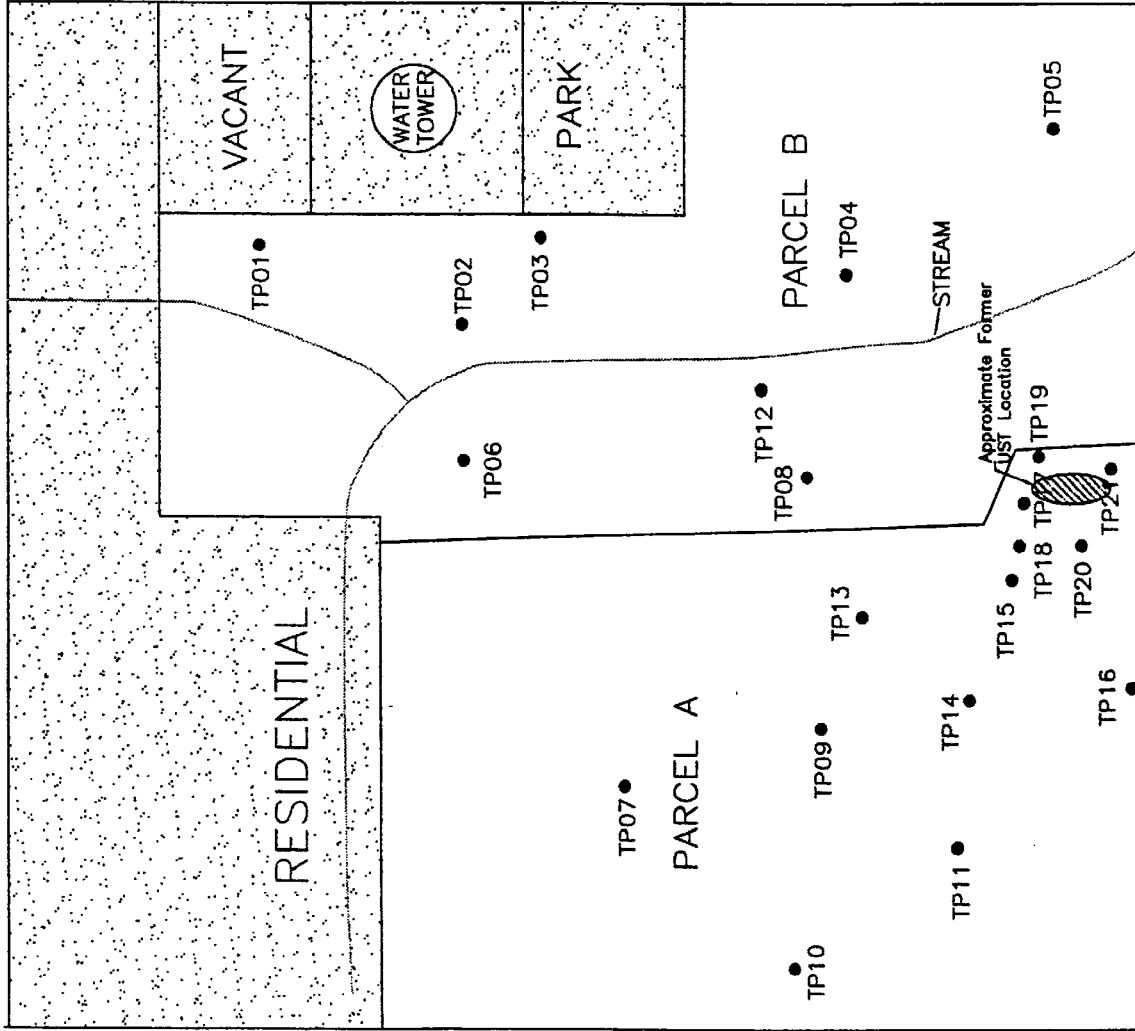
File: 1068.04.21





WEST ELEVENTH STREET

WASHINGTON AVENUE

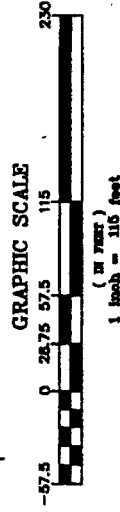


GRAY STREET

WEST TENTH STREET

WEST NINTH STREET

KEY  
● TEST PIT LOCATION



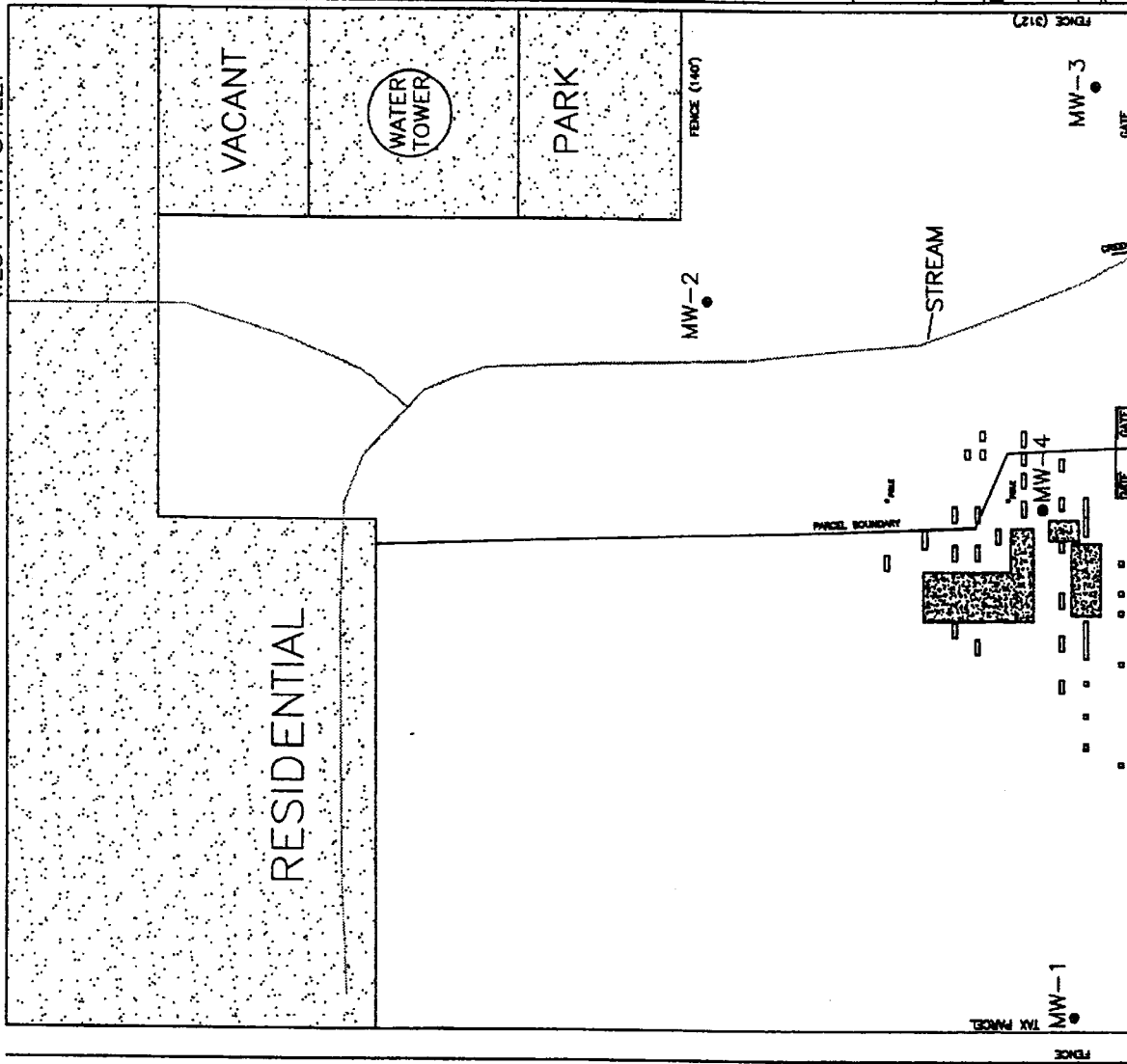
**WNIK ASSOCIATES, INC.**  
Environmental Evaluation,  
Investigation, and Remediation

P.O. Box 287, 710 Wilmington Road  
New Castle, Delaware 19720-0287 302 322-2558  
302 322-8921 fax

FACILITY EVALUATION SAMPLE LOCATIONS  
DEEMER STEEL PROPERTY  
NEW CASTLE, DELAWARE

BY	DATE	SCALE	AC FILE
JOA	2/19/99	1:1380	DSCC
CHECKED	DATE	DWG. NO.	REV.
SAJ	2/19/99	FIGURE 3	2
PROJECT #	1068.04.21		

WEST 11TH STREET



WASHINGTON AVENUE

GRAY STREET

WEST TENTH STREET

KEY

- TEST PIT
- MONITORING WELL
- SUBSURFACE CONCRETE

GRAPHIC SCALE



(IN FEET)  
1 inch = 100 feet



ASSOCIATES, INC.  
Environmental Evaluation,  
Investigation, and Remediation

P.O. Box 287, 710 Wilmington Road  
New Castle, Delaware 19720-0287  
302 322-2558  
302 322-8921 fax

REMEDIAL INVESTIGATION TEST PIT AND MONITORING


WELL LOCATION MAP

DEEMER STEEL PROPERTY

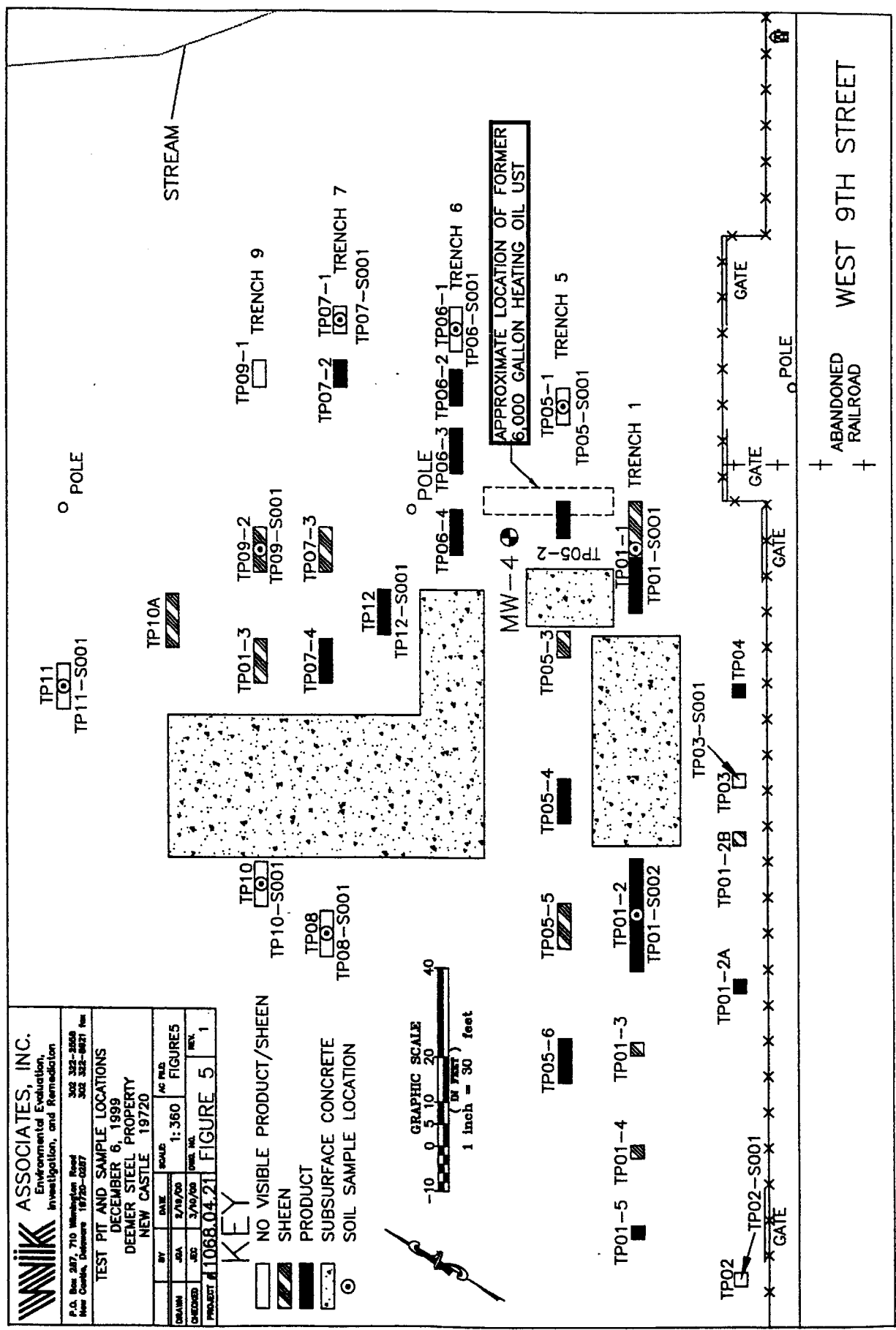
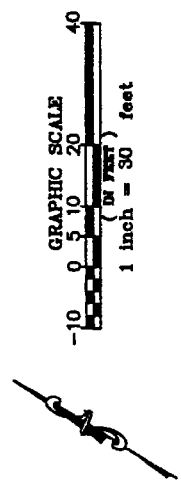
NEW CASTLE, DELAWARE 19720

DATE 2/19/98  
BY JGA  
SCALE 1:1200  
DSCCPTS

CHECKED JSC 3/16/00  
PROJECT # 1068.04.21  
FIGURE 4  
REV. 2

 <b>NIKK ASSOCIATES, INC.</b> Environmental Evaluation, Investigation, and Remediation				
P.O. Box 287, 710 Wilmington Road New Castle, Delaware 19720-0287 302 322-2559 302 322-8821 fax				
<b>TEST PIT AND SAMPLE LOCATIONS</b> DECEMBER 6, 1999 DEEMER STEEL PROPERTY NEW CASTLE 19720				
BY	DATE	SCALE	AC	FIGURE 5
JDA	2/18/00	1:360		
CHECKED	JDC	3/10/00	DRW. NO.	REV.
PROJECT # 1068.04.21		FIGURE 5		1

- KEY**
- NO VISIBLE PRODUCT/SHEEN
  - ▨ SHEEN
  - PRODUCT
  - ▤ SUBSURFACE CONCRETE
  - SOIL SAMPLE LOCATION



# Appendix A

**Table 3**  
**Summary of DNREC Soil Screening**  
**Results and**  
**Additional Analysis**  
**Deemer Steel RI/FS**  
**New Castle, Delaware**

Laboratory	DNREC	DNFHE	DESV	DNHEB	Columbia Analytical Services	Columbia Analytical Services
Sample ID	PCB (ppm)	PAH (ppm)	VPH (ppm)	DRO (ppm)	PAH (ppm)	EPH (ppm)
TP01-S001	ND	3,000 ppm (DRO C9-C28)	Detected	ND		
TP01-S002	ND	1,300 ppm (DRO C9-C28)	Detected	ND		x
TP02-S001	ND	3,500 ppm (DRO C9-C28)	Detected	ND	x	x
TP03-S001	ND	ND	Detected	ND		
TP05-S001	ND	ND	ND	ND		
TP06-S001	ND	ND	ND	ND		
TP07-S001	ND	ND	Detected	ND	x	x
TP08-S001	ND	ND	ND	ND		x
TP09-S001	ND	ND	Detected	ND		
TP10-S001	ND	ND	ND	ND		
TP11-S001	ND	130 ppm (HRO C18-C36)	Detected	ND	x	x
TP12-S001	ND	29,000 ppm (DRO C9-C28)	ND	ND	x	x
Trip Blank					x	

**NOTES:**

ND: Not Detected

ppm: parts per million

PCB: Polychlorinated Biphenyls

EPH: Extractable Petroleum Hydrocarbons

PAH: Polycyclic Aromatic Hydrocarbons

VPH: Volatile Petroleum Hydrocarbons

DRO: Diesel Range Organics

HRO: Heavy Range Organics

X: Submitted for Analysis at Columbia Analytical Services

**TABLE 4**  
**Soil Analytical Results**  
**Deemer Steel RI/FS**  
**New Castle, Delaware**

		Sample ID	TP12 S001	TP12 S002	TP12 S003	TP12 S004	TP12 S005	TP12 S006
		Operator	6/13	6/14	6/15	6/16	6/17	6/18
UNREF. DRS		UNREF. DRS						
DATE		DATE						
TIME		TIME						
<b>TP12 Ranges</b>								
C9 - C18 Aliphatics	1,000	2,500	300	630	ND	41	ND	4,400
C19 - C36 Aliphatics	2,500	5,000	170	100	ND	52	ND	670
C11 - C22 Aromatics	800	2,000	210	440	45	39	27	3,600
<b>PAHs</b>								
Acenaphthene	470	5,000	0.37	0.22	ND	ND	0.18	5.5
Acenaphthylene	nca	nca	ND	ND	ND	ND	ND	ND
Anthracene	1,000	5,000	0.3	ND	ND	ND	0.74	ND
Benzo(a)anthracene *	0.9	8	0.6	ND	0.82	ND	2.1	0.32
Benzo(a)pyrene *	0.09	0.8	0.57	ND	1.4	ND	2.3	0.22
Benzo(b)fluoranthene *	0.9	8	0.47	ND	1.5	ND	2.3	ND
Benzo(g,h,i)perylene	nca	nca	0.32	ND	1.1	ND	1.4	0.17
Benzo(k)fluoranthene *	9	78	0.55	ND	0.84	ND	1.5	ND
Chrysene *	87	780	0.59	ND	0.93	ND	2.3	0.5
Dibenzo(a,h)anthracene *	0.09	0.8	ND	ND	0.34	ND	0.42	ND
Fluoranthene	310	5,000	1.4	ND	1	0.18	4.5	1.4
Fluorene	310	5,000	0.57	0.61	ND	ND	0.32	8.2
Indeno(1,2,3-cd)pyrene *	0.9	8	0.3	ND	1	ND	1.3	ND
2-Methylnaphthalene	160	4,100	ND	ND	ND	ND	ND	ND
Naphthalene	160	4,100	ND	ND	ND	ND	ND	ND
Phenanthrene	1,000	5,000	1.4	0.32	0.23	ND	3	13
Pyrene	230	5,000	1.4	0.26	1.1	0.17	4.4	3.9
<b>VPH Ranges</b>								
C5 - C8 Aliphatics	100	500	NA	1.6	ND	NA	ND	1.2 J
C9 - C12 Aliphatics	1,000	2500	NA	11	ND	NA	ND	26 J
C9 - C10 Aromatics	100	500	NA	27	1	NA	ND	53 J
<b>BTEX</b>								
Benzene	0.8	200	NA	ND	ND	NA	ND	ND UJ
Toulene	650	5000	NA	ND	ND	NA	ND	0.075 J
Ethylbenzene	400	5000	NA	ND	ND	NA	ND	ND UJ
Total Xylenes	420	5000	NA	ND	ND	NA	ND	ND UJ
methyl tert-butyl ether (MTBE)	39	1000	NA	ND	ND	NA	ND	ND UJ
Naphthalene	160	4100	NA	1.8	ND	NA	ND	8.1 J

NOTES:

All results in mg/kg  
 ND - Not detected above method detection limit  
 NA - Not Analyzed  
 Bold - Exceeds Unrestricted Use Level  
 Shaded - Exceeds Restricted Use Level  
 ND: Not Detected  
 J/UJ - The indicated concentration is estimated

EPH: Extractable Petroleum Hydrocarbons

PAH: Polycyclic Aromatic Hydrocarbons

VPH: Volatile Petroleum Hydrocarbons

- Carcinogenic PAHs

nca - No criteria available

B - Reported result questionable because of blank contamination  
Potential interference in the laboratory

**TABLE 5**  
**Groundwater Analytical Results**  
**Deemer Steel RI/FS**  
**New Castle, Delaware**

Sample ID Operable Unit Sampling Date Units	DNREC HSCA Groundwater URS (12/99)	MW1-W001 OU 2 01/19/00 ug/L	MW2-W001 OU 2 01/19/00 ug/L	MW3-W001 OU 1 01/19/00 ug/L	MW4-W001 OU 3 01/19/00 ug/L
<b>VOLATILE COMPOUNDS (GC/MS)</b>					
Total Estimated Conc. VOA TICs (s)	nca	0	0	0	31 J
All other VOCs were below laboratory detection limits					
<b>SEMI-VOLATILE COMPOUNDS (GC/MS)</b>					
Pyrene	18	0.6 U	0.7 U	0.6 U	1.0
bis(2-Ethylhexyl)phthalate	6	1.7 B	2.5 B	1.7 B	1.6 B
Total Estimated Conc. BNA TICs (s)	nca	0	0	0	32 J
All other SVOCs were below laboratory detection limits					
<b>PESTICIDES/PCBs</b>					
All Pesticides/PCBs were below laboratory detection limits					
<b>METALS and CYANIDE</b>					
Aluminum	200	10,800 J	1,580 J	756 J	115 J
Arsenic	50	6.7	3.6 U	3.6 U	3.6 U
Barium	2,000	343	325	280	330
Beryllium	4	0.40	0.20 U	0.20 U	0.20 U
Calcium	nca	44,500	19,100	3,450	74,600
Chromium	11	20.2	2.8 B	1.2 B	1.1 U
Cobalt	220	19.9	10.1	6.5	1.0 U
Copper	1,300	11.9	2.7 U	2.7 U	2.7 U
Iron	300	38,600	1,450	688	5,210
Lead	15	20.0	2.1 U	2.1 U	2.1 U
Magnesium	nca	30,700	11,900	3,600	77,200
Manganese	50	2,820	1,660	173	2,510
Mercury	0.4	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	100	12.7	24.6	8.8	1.4 U
Potassium	nca	5,440	2,560	1,460	12,100
Sodium	nca	41,300	78,900	45,700	47,600
Vanadium	26	29.8	3.4	1.4	1.3 U
Zinc	2,000	147	118	128	69.1 B
All other metals and cyanide were below laboratory detection limits					

NOTES:  
 Bold - Exceeds Groundwater URS  
 J/U - The indicated concentration is estimated  
 U - The compound was not detected at the indicated concentration  
 nca - No criteria available  
 B - Reported result is questionable because of blank contamination  
 Potential interference in the laboratory  
 N/A - Not Applicable